Notes - Solutions by Factoring + the Zero Product Property

- In the space to the right, state what happens in each step + why.

Ex 1: $x^2 + 5x + 6 = 0$

$(x+2)(x+3) = 0$ Factored (what?)

So, either $(x+2) = 0$ Set each factor $= 0$ (what?)

or $(x+3) = 0$ Z.P.P. (why?)

$x + 2 = 0$ $\quad$ $x + 3 = 0$ Solve each equation (what?)

$\underline{\ \ -2 \quad -2\ \ }$ $\quad$ $\underline{\ \ -3 \quad -3\ \ }$

$x = -2$ $\quad$ $x = -3$

$x = -2$ and -3

Ex 2: Find the solutions of $4x^2 + 16x = 0$

$4x(x+4) = 0$ ____________ (what?)

So $\frac{4x}{4} = \frac{0}{4}$ or $x + 4 = 0$ ____________ (what?)

$-4 \quad -4$ ____________ (what?)

$\boxed{x = 0 \text{ and } x = -4}$

Ex 3: Find the solutions of $x^2 - 4x = 12$

$x^2 - 4x - 12 = 0$ Make eq. $= 0$, subtract 12 from both sides (what?)

need ZPP, solutions (zeros) only happen when $y = 0$ why?

$(x-6)(x+2) = 0$ factor (what?)

so $x - 6 = 0$ or $x + 2 = 0$ set each factor $= 0$ (what?)

$\boxed{x = 6 \text{ and } x = -2}$ solve each eq. (what?)

Based on the three examples find some patterns

- Before you can factor, what do you need to make sure the equation is equal to? Why?

  0 b/c solutions happen where $y = 0$

- What do you do right after you factor? Why do you think this is called using the "zero product property"?

  Set each piece = 0
  factor

  Z.P.P.

  $* \cdot \smile = 0$

  $* = 0$ or $\smile = 0$

- What is the last step in this method of solving by factoring?

  Solve each equation

Now You Do!

1) $x^2 + 7x + 10 = 0$

2) $3x^2 = 10x$

p. 303 #4-7